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PUBLIC SAFETY RADIO
COMMUNICATIONS PLAN
FOR
REGION 50
THE STATE OF TEXAS

January 30, 1992

ACKNOWLEDGEMENT

The Public Safety Radio Communications Plan for Region 50 provides operations and system design requirements in response to Federal Communications Commission Report and Order 87-112. This Plan establishes the structure by which eligible agencies may request frequencies from the 821-824/866-869 MHz band. Written by the Regional Communications Planning Committee - Region 50, it represents months of effort by some of the most experienced public safety communications personnel in West Texas.

The Region 50 Plan has benefitted significantly from the Region 40 Plan, the Region 23 Plan, and the APCO Plan. Region 50 has recognized the need for compatibility with contiguous Regions, and opted to partake of those plans for that purpose. The Region 50 Committee believes that somewhat standardized plans for the State of Texas will be of benefit to all Regions within the State.

I would like to thank the staffs of the four regional planning commissions included in Region 50: Rio Grande Council of Governments, Permian Basin Regional Planning Commission, Concho Valley Council of Governments and West Central Texas Council of Governments, and the staffs of APCO and CET.

It is our sincere hope that this plan will eventually be used to alleviate the age old problems associated with the lack of inter-operability between all Public Safety/Public Safety entities, be they Local, County, State or Federal.

B. John McDaniel
Regional Communications Planning
Committee - Region 50

PUBLIC SAFETY RADIO
COMMUNICATIONS PLAN
FOR
* REGION FIFTY *

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1.0 SCOPE

1.1 INTRODUCTION

In December of 1983, the United States Congress directed the Federal Communications Commission (FCC) to establish a plan to ensure that the communications needs of state and local public safety authorities would be met. By their regular means of initiation, the FCC began the process of developing such a plan. Through their efforts, and the efforts of the National Public Safety Planning Advisory Committee (NPSPAC) the plan was begun.

The National Public Safety Planning Advisory Committee provided an opportunity for the public safety community and other interested members of the public to participate in an overall spectrum management approach by recommending policy guidelines, technical standards, and procedures to satisfy public safety needs for the foreseeable future. After consideration of NPSPAC's Final Report and comments filed in Docket No. 87-112, a Report and Order was released by the FCC in December 1987, which established a structure for the National Plan that consists of guidelines for the development of regional plans.

The National Plan provides guidelines for the development of regional plans. The particulars of this plan are found in FCC 87-359, which contains the required steps and contents for regional plan development. It is on this document that this plan is developed.

1.2 PURPOSE

Public safety communications has, for many years, been inadequate throughout the United States. This is as true for Texas as it is for any other state. Many, if not all, public safety radio users are constantly bombarded with outside interference, noise, and over crowding. It is with these problems in mind that this plan was developed.

This regional plan was developed with the objective of assuring all levels of public safety/public service agencies that radio communications in the near and distant future will not suffer from the problems of the past. The allocation of frequencies was done in as equitable a way as possible. The goal was to supply a pool of frequencies for each county and a pool for state agency use with adequate reserve allocations for future needs in all areas, and a method to appeal initial allocations based on need.

The National Plan, as developed by NPSPAC, was followed very closely in all considerations for frequency allocation, re-use, turn back, regional interoperability, spectrum requirements and adjacent region operations. This plan should provide the flexibility to accommodate the growth and changes which are bound to occur in public safety and public service communications operations long into the future.

2.0 AUTHORITY

2.1 REGIONAL PLANNING COMMITTEE

The development of the Public-Safety Radio Communications Plan for Region 50, one of several regions in the State of Texas, has followed the requirements of the FCC's Report and Order as issued in the matter of General Docket 87-112.

In accordance with the FCC's Report and Order 87-112, the Associated Public-Safety Communications Officers Inc. (APCO) recommended to the Commission the appointment of a "Convener" for Texas, Region 50. The Convener served as the coordinator for the assembly and formation of the planning committee.

Key participants in the formation of the Regional Planning Committee represent interested parties from both the Public Safety and Special Emergency Radio Services. A total of more than 20 individuals have participated in the development process. The list herein contains the names, organizational affiliations, mailing addresses and phone numbers of all participants in the Regional Planning Committee.

The committee was selected by attendance at the planning meetings. Each member of the Committee representing an eligible licensee under the Public Safety Radio Services and the Special Emergency Radio Services was entitled to one vote in all Committee matters. Except as may be provided elsewhere in the Plan, the majority of those present at a scheduled meeting constituted a majority for all business. Only the final approval of the plan prior to submission to the FCC required a vote from more than would be in attendance at a regular meeting. In this case the vote was conducted by mail ballot sent to all those who had participated in the planning process. This way, the finished plan was reviewed and accepted by the widest, within reason, group of public safety/public service users.

2.2 PLANNING COMMITTEE FORMATION

The process of forming the Planning Committee was conducted in the following steps:

1. A personal interview was held with the representative of all major state agency radio users.
2. Presentations concerning the requirements for a regional planning committee were presented and discussed at state APCO meetings. At each presentation there was an opportunity for persons to place themselves and/or their agency on the mailing list.
3. A public notice was placed in an area newspaper with Regional distribution, for the first planning committee meeting. This first meeting was held at the Permian Basin Regional Planning Commission, Midland International Airport, 2514 Pliska Drive, Midland County, Texas, a public facility. (See Appendix A).

2.2 PLANNING COMMITTEE FORMATION (continued)

4. The chairperson was elected at the first Organization Meeting.
5. Committee membership was left open to any person or agency which may not have been notified or decided to join the committee later.
6. Vendors participation was encouraged, but vendors were not allowed a vote.
7. A Regional Bulletin was sent to all law enforcement agencies via the Texas Law Enforcement Telecommunications Network (TLETS). (See Appendix A).

2.3 NATIONAL INTERRELATIONSHIPS

The Regional Plan is in conformity with the National Plan. If there is a conflict between the two plans, the National Plan will govern. It is expected that Regional Plans for other areas of the country may differ from this plan due to the broad differences in circumstance, geography, and population density. By officially sanctioning this plan the Federal Communications Commission agrees to its conformity to the National Plan. Nothing in the Plan is to interfere with the proper functions and duties of the organizations appointed by the FCC for frequency coordination in the Private Land Mobile Radio Services, but rather it provides procedures that are the consensus of the Public Safety Radio Services and Special Emergency Radio Service user agencies in this Region. If there is a perceived conflict then the judgment of the FCC will prevail.

2.4 FEDERAL INTEROPERABILITY

Interoperability between the Federal, State and Local Governments during both daily and disaster operations will primarily take place on the five common channels identified in the National Plan. Additionally, through the use of S-160 or equivalent agreements, a licensee may permit Federal use of a non-Federal communications system. Such use, on other than the five identified common channels, is to be in full compliance with FCC requirements for government use of non-government frequencies (Title 47 CFR, sec 2.103). It is permissible for a non-Federal government licensee to increase channel requirements to account for 2-10 percent increase in mobile units, dependent on the amount of Federal Government Agencies involvement in its area, provided that written documentation from Federal agencies supports at least that number of increased units.

2.5 REGIONAL REVIEW COMMITTEE

Upon approval of this Plan by the Federal Communications Commission, a Region Review Committee will be established for the review of applications which do not fall within the stated guidelines provided for in this plan, or for the

2.5 REGIONAL REVIEW COMMITTEE (continued)

settlement of disputes concerning this plan and/or its application.

This committee shall consist of each of the following agencies/organizations: a Council of Governments representative, a Municipal Police representative, a Fire service representative, a Sheriff's Department representative, an Emergency Medical services representative, and a representative jointly appointed by the Texas Department of Public Safety and the Texas State Highway Department. This committee and its composition each of the following agencies: State, Municipal Police, Fire, Sheriff, Emergency Medical Service, and a representative from other eligibles will also be welcome. This committee and its composition will be assured by the Texas APCO chapter and other Public Safety organizations. Membership on this committee will be solicited on an annual basis. Since this committee will probably not have regular business, it will be up to the Region 50 Chairman to notify the committee of problems, conflicts, or when it becomes apparent that spectrum demands will outpace available spectrum. Each member of the committee shall be furnished a copy of this plan upon their appointment or election to the committee.

Plan updates shall be accomplished by this committee. All changes or updates to the plan shall be first agreed upon by this committee and then submitted to the FCC for their review and consideration. When approved all changes shall be added to the plan with the appropriate documentation of approval.

This committee shall meet at least once annually to review the implementation of the plan. This review shall consist of examination of any and all license activity.

3.0 SPECTRUM UTILIZATION

This portion of the Plan provides a basis for proper spectrum utilization. Its purpose is to guide the Local APCO Frequency Advisor and/or the Regional Review Committee in their task of evaluating the implementation of this plan within this Region.

3.1 REGION DEFINED

Region 50 is within the State of Texas. This region is the result of definition by the Federal Communications Commission as a result of recommendations made in the National Public Safety Planning Advisory Committee (NPSPAC) plan as submitted and approved and contained in Docket 87-112.

3.2 REGION PROFILE (DEMOGRAPHIC INFORMATION)

The purpose of this section is to provide the basis for the assignment of frequencies, and their re-use. Since the frequency allocation formula used is

3.2 REGION PROFILE (DEMOGRAPHIC INFORMATION) (continued)

based on population within a county, it is necessary to provide this information within this plan. Below is the data used in the determination of frequency allocations.

Region 50 Population by County

El Paso	578,652
Hudspeth	2,314
Culberson	3,172
Jeff Davis	1,800
Presidio	5,608
Brewster	8,169
Gaines	13,211
Dawson	15,295
Borden	812
Andrews	15,379
Martin	4,905
Howard	33,646
Loving	61
Winkler	8,495
Ector	122,309
Midland	103,935
Glasscock	1,226
Ward	13,863
Crane	4,520
Upton	4,914
Reeves	14,637
Pecos	15,038
Terrell	1,614
Knox	5,227
Kent	1,130
Stonewall	2,284
Haskell	6,703
Throckmorton	2,016
Shackleford	3,668
Scurry	18,407
Fisher	5,432
Jones	17,113
Comanche	12,615
Stephens	10,443
Mitchell	8,887
Nolan	17,106
Taylor	122,797
Callahan	12,759
Eastland	20,526
Runnels	12,121
Coleman	10,358
Brown	34,154
Irion	1,980

3.2 REGION PROFILE (DEMOGRAPHIC INFORMATION) (continued)

Tom Green	98,587
Concho	2,494
McCulloch	8,855
Crockett	4,205
Schleicher	2,897
Menard	2,407
Mason	3,402
Sutton	4,390
Kimble	4,182
Sterling	1,514
Coke	3,563
TOTAL	1,440,008

SOURCE: From the annual projection of populations from the State Data Center of the Texas Department of Commerce for July 1, 1987. The estimates are prepared by the Department of Rural Sociology, Texas A&M University.

3.2.1 REGION 50 POPULATION AND EXPECTED GROWTH PERCENTAGE

The population of the Region 50 is divided between urban and rural residence. The urban population is some 71 percent and the rural 29 percent. The population within developed urban areas is about 1,026,180. Rural area population is about 413,828 for an approximate total of 1,440,008.

3.2.2 GEOGRAPHICAL DESCRIPTION

There are 55 counties in Region 50 with a total land mass of 78,562 square miles. The largest county is Brewster, with a total of 6,169 square miles. There are no water areas of significance. Region 50 includes a portion of Central, and all of West Texas.

As is shown above, the population of Region 50 is not evenly distributed across the land area contained in the Region. This presents some problems in area coverage for radio systems in that the entire land area of any given jurisdiction must be covered. The population per square mile is somewhat sparse which generally indicates that the concentration of radio users for public safety activities is also sparse, except for major metropolitan areas. There are approximately five (5) major population areas in Region 50. Terrain in Region 50 includes mountains, rolling hills and rolling plains. All of these items were taken under consideration in the allocation plan.

3.3 USAGE GUIDELINES

All systems operating within the Region having five or more channels will be required to be trunked. Those systems having four or less channels may be conventional or trunked.

3.3 USAGE GUIDELINES (continued)

The FCC, in its Report and Order states, "Exceptions will be permitted only when a substantial showing is made that alternative technology would be at least as efficient as trunking or that trunking would not meet operational requirements. Exceptions will not be granted routinely, however, and strong evidence showing why trunking is unacceptable must be presented in support of any request for exception."

Systems of four or less channels operating in the conventional mode who do not meet FCC loading standards will be required to share the frequency on a non-exclusive basis.

Public Safety communications at the state level, as it impacts the Region, will be reviewed by the Committee. State-wide public safety agencies will submit their communications plans for impact approval if they utilize communications systems within the Region and those portions of such systems must be compatible with the Regional Plan.

The next level of communication coverage will be a county/multiple municipality area. Those systems that are designed to provide area communication coverage must demonstrate their need to require such wide area coverage.

This would apply in a situation such as a city requesting coverage of an entire county. Communication coverage beyond the bounds of a jurisdictional area of concern cannot be tolerated unless it is critical to the protection of life and property and the maintenance of essential public services. If the 800 MHz trunked radio technology is utilized, the system design must include as many county/multiple municipality government public safety and public service radio users as can be managed technically.

The county/multiple municipality agency(ies), depending upon systems loading and the need for multiple systems within an area, must provide intercommunications between area-wide systems. In a multi-agency environment, a lead agency using the 800 MHz spectrum, which is an agency or organization having primary response obligations in the geographic area, shall be responsible for coordinating the implementation the Common Channels in this band as mandated by the National Plan. Such implementation must be reviewed and approved by the Local APCO Frequency Advisor, and at his/her discretion, the Regional Review Committee.

Municipal terminology often differs. In order to provide a title for the next level of communications the term City is used to define the level below county-wide. City communications for public safety and public services purposes must provide only the communications needed within its boundaries. However, if the total number of radios in service does not reach minimum loading criteria for a trunked system, that must consider utilizing the next higher system level if 800 MHz trunked radio is available in the area. As those higher level systems reach capacity, the smaller system communicators in public safety and public service must then consider uniting their communications efforts to formulate one large system or forfeit use of the limited 800 MHz spectrum.

3.3 USAGE GUIDELINES (continued)

Where smaller conventional 800 MHz needs are requested, those frequencies to be utilized must not interfere with the region's trunked systems. The 800 MHz trunked radio system is to be considered the higher technology at this time and in greater compliance with FCC guidelines. The amount of interference that can be tolerated depends on the service affected. Personal life and property protection shall receive the highest priority and disruptive interference with communications involved in these services in an area shall not be tolerated. Any co-channel interference within an authorized area of coverage will be examined on a case by case basis by the Regional Review Committee. Protection ratios must be maintained and adhered to.

3.4 TECHNICAL DESIGN REQUIREMENTS FOR LICENSING

3.4.1 DEFINITION OF COVERAGE AREA OR AREA OF JURISDICTION

The coverage area shall be that area for which a system is intended to cover with a received signal strength of greater than 40 dBu. This area shall normally represent the boundaries of the County or the incorporated municipality which is applying for license. In the case of regional or area-wide, multi-jurisdictional systems, the coverage shall be that area of all jurisdictions participating in the system combined.

3.4.2 SYSTEM COVERAGE LIMITATIONS

System coverage shall be limited to the coverage area defined as listed above plus no more than five (5) additional miles in all directions extending from said boundaries of definition. This limitation shall assure maximum frequency reuse. The only exception to this rule shall be those applicants wishing to offer service or system use to areas outside of their jurisdictional boundaries. In these situations the applicant shall provide a proposal of said service to the Local APCO Frequency Advisor, who may request Regional Review Committee consideration, for approval.

Systems not located within the geographical center of the jurisdiction(s) for which they cover shall utilize either directional antennas or antenna/tower relationship techniques to achieve the coverage required by this plan.

3.4.3 DETERMINATION OF COVERAGE

There are four variables used in determining the area of coverage of a proposed system. These variables are (1) the required strength of the received signal, (2) antenna height above average terrain (HAAT), (3) the effective radiated power (ERP) of the system, and (4) the type of environment.

Received Signal Strength:

3.4.3 DETERMINATION OF COVERAGE - continued

For purposes of this plan, received signal strength shall be the determining factor which defines the actual boundary of a system. The minimum signal level which marks the outer boundary of a system shall be 40 dBu.

Antenna Height:

Shall be the height of the antenna above the average terrain surrounding the tower site.

Effective Radiated Power (ERP):

The ERP is the transmitter output power times the net gain of the antenna system. The actual formula is: $ERP(w) = \text{Power}(w) \times \text{Antilog}(\text{net gain in dB divided by } 10)$.

Environment Type:

OKUMURA/HATA METHOD - The Okumura method uses four different classifications to describe the average terrain around a transmitter site or area. The classifications are:

1-URBAN; Which is built-up city-crowded with large buildings or closely interspersed with houses and thickly-grown trees. This would include the downtown area of a major city.

2-SUBURBAN; Which is a city of highway scattered with trees, houses and buildings. This would include the downtown area of a large city.

3-QUASI-OPEN; Is an area between suburban and open areas. This includes areas outside of city limits that have few buildings and houses.

4-OPEN; Is an area where there are no obstacles such as tall trees or buildings in the propagation path or a plot of land which is cleared of anything for 300 to 400 meters ahead. This would include farm land, open fields, etc.

The Okumura/Hata method is the method resident in the computer packing program to develop this plan. A minimum system shall be permitted without special consideration when it is limited to an HAAT of 100 feet to the tip of the antenna, and the transmitter is centrally located within the jurisdiction or jurisdictions participating in a system. In all jurisdictions, regardless of size, a maximum boundary radius of 16 miles shall be allowed provided adequate measures have been taken to assure that interference of existing co-channel and adjacent channel systems will not occur. Preparation of these requirements shall be the responsibility of the applicant. The Federal Communications Commission provides, in part 90.309(a)(4) of the Rules and Regulations, some additional guidance for these calculations. The Carey Curve Method is also an acceptable method, and may be used in the determination of coverage area.

3.4.4 ANNEXATIONS AND OTHER EXPANSIONS

It is well known that as cities grow, annexations occur. When an expansion of the present city limits of any city currently using an 800 megahertz system within the spectrum as herein specified occurs, it is understood that the existing system may have to be expanded and its range increased. This is a modification and may be permitted. The increased range of the system will have to be determined at the time of modification to assure non-interference with any other existing system. Where interference is likely, the use of alternate methods of expansion, such as satellite systems, may be necessary.

Should the annexation or expansion of a city effectively take in all or most of a county, the allocation for that county may be given to the city if required by said city and not in use or planned to be used by the county. Where more spectrum is not available from the initial allocation, the rules for expansion of initial allocation, as contained in this plan, shall apply.

3.4.5 COVERAGE AREA DESCRIPTION

All applicants shall provide with their applications a map showing the jurisdictional boundaries to be covered by the system, and the calculated system coverage. This map shall display the location of the system transmitter(s), including control stations. It is recommended that a U.S. Geological Survey (USGS) Quad topographical map be used for this purpose. If not available, a high quality locally produced map or a highway map may be substituted. Regardless of the type map used, the name of the applicant and the scale of the map shall be displayed on the map.

The following table lists the field strength in dBu/KW versus distance and antenna height for the suburban environment. The adjustment factors for the other environments relative to the suburban environment are:

Urban = Suburban - 9.7 dB,
Quasi-open = Suburban + 9.2 dB,
Open = Suburban + 18.4 dB

3.4.6 REASSIGNMENT OF FREQUENCIES

All agencies participating in the use of the new 800 megahertz spectrum shall prepare and submit a plan for the abandonment of their currently licensed frequencies in the lower bands. These regional planning committees would have the freedom to consider below -800 MHz public safety banks in developing their regional plans, but the licensing of channels in these banks would continue to be conducted through existing frequency coordination procedures.

Frequencies which are to be abandoned by an agency shall not be handed down to another agency within the respective jurisdiction. It is recommended that any jurisdiction wishing to "hand down" frequencies to another agency submit the proper coordination and application forms with the document of release.

3.4.6 REASSIGNMENT OF FREQUENCIES - continued

The time frame allowed for phasing into 800 MHz and out of the lower currently licensed bands will be considered on a case by case basis by the review committee. Generally, one year will be considered acceptable in most cases, with two years as a maximum. Any agency requiring more than two years shall provide documents stating the reasons for the delay, and give the estimated time of completion.

3.4.7 UNUSED SPECTRUM

Due to the fact that all of the frequency spectrum is not needed at this time, the excess channel pairs will be returned to a reserve pool. These channels may be used for conflict with adjacent Region allocations or may simply remain within this Region until needed. This does not imply that these frequencies are unavailable, only that before they can be utilized within the Region they must be coordinated via the regular APCO coordination process and within the guidelines set forth in this plan. Where possible, the channels designated for a jurisdiction in this plan shall be used.

3.4.8 ADJACENT REGION CONSIDERATIONS

Coordination with adjacent regions shall be an on-going process until all region plans have been finalized. At present, all adjacent regions have been coordinated with and no conflicts have been identified. The adjacent regions with which coordination has been conducted are: Region 29; Region 40; Region 49; Region 52; and Region 53. (APPENDIX B)

As the use of the five National channels is not considered a day-to-day function, the "hard" coordination for the use of these channels is not considered to be necessary or advisable. The use of these channels will always be on a non-interference basis, with on-the-air coordination at the time of use when required. Any user found to be operating in any manner other than this shall be considered to be operating improperly and subject to the existing Federal Communications Commission rules for willful interference with the communications of other users.

3.5 INITIAL SPECTRUM ALLOCATION

3.5.1 FREQUENCY SORTING METHODOLOGY

The initial spectrum allocation for the Region was determined by a computerized frequency sorting process performed by APCO/CET. The purpose of the computer program which assigns frequencies to specific eligibles and to pools for future assignments is two-fold:

3.5.1 FREQUENCY SORTING METHODOLOGY - continued

- A) The assignments must result in a high degree of spectrum efficiency, and
- B) The assignments must result in a low probability of co-channel and adjacent channel interference.

Since the desired output is a geographic sorting of frequencies, a method of defining geography must be part of the input. A list of the number of channels to be assigned in each geographic area is also required, along with the name of the eligible or pool.

Acceptable interference probabilities are determined for the Region. Frequency assignments are then made using a computer program which satisfies the goals of spectrum efficiency and interference protection. The following narrative describes the factors and process used by the computer program.

3.5.2 GEOGRAPHIC AREA

For the purpose of this frequency sort, a geographic area is defined as one or more circles of equal radius. To the degree practical, the circle(s) should include the entire area of the eligible's geopolitical boundary, but not exceed the boundary by more than three (3) miles. Thus, the procedure is to gather maps of sufficient detail, outline the areas to be defined, determine the coordinates and radius of the circles which define each area, and tabulate the data.

3.5.3 DEFINE THE ENVIRONMENT

The environment of each system is defined according to the Okumura/Hata method of classifications.

3.5.4 BLOCKED CHANNELS

In the Region there are five mutual aid channels which must be blocked out to prevent the computer from making assignments on these channels. (Since the mutual aid channels are spaced at 0.5 MHz intervals, other Region-wide systems are spaced at 0.5 MHz and placed adjacent to the mutual aid channels. This procedure reduces the impact of blocked adjacent channels by virtue of the fact that the channel plan already has protection spacing on each side of the mutual aid channels.)

These similar provisions were made for those channels assigned to State Agencies on a state-wide basis, and channels affected by 47 CFR Part 90 Sec. 90.601 and 90.619, concerning counties within 68.4 miles of the Mexican border blocked channels are identified by FCC channel number, tabulated and they become input to the computer program.

3.5.5 TRANSMITTER COMBINING

The computer program is designed to provide a minimum frequency separation between any two channels assigned to the same eligible at the same site. This separation is provided in order to enable more efficient combining of multiple transmitters to a single antenna. These separated blocks of frequencies also have a maximum size. That is, if the eligible has more frequencies than the maximum size of the combining block, then a second compatible block is created, and so on. Each of these parameters is adjustable in the program on a global basis. The default parameters chosen are 0.25 MHz minimum spacing and five channel blocks.

3.5.6 SPECIAL CONSIDERATIONS

There are licensees in the 806-821/852-866 MHz spectrum who plan to expand existing systems into the 821-824/866-869 MHz bands. Some of the existing radio units are unable to operate on 12.5 MHz separated carrier frequencies. The result is that these radios can only operate on "even" FCC numbered channels in the 821-824/866-869 MHz band. The computer program is able to take this into account when making assignments.

3.5.7 PROTECTION RATIOS

There are two interference protection ratios built into the computer program. One is for the co-channel case, the other is for the adjacent channel case. The ratios provide 35 dB Desired/Undesired signal ratio for co-channel assignments, and 15 dB Desired/Undesired ratio for the adjacent channel case. These ratios provide an acceptable probability of interference for Public Safety Services.

3.5.8 ADJACENT REGION COORDINATION

The computer program requires a listing of channels to be blocked along the borderline with other regions which have pre-existing plans. If the adjacent region plan was developed using the APCO/CET packing program, this information exists in the database. The Region 40 plan was developed by another method, and the data was obtained from that region's plan in order to build the exclusion list.

3.6 CONTROL STATIONS

Control stations within a system shall be limited in both transmit power, and antenna orientation. The control station design shall be such that the received signal strength at the mobile relay is approximately 6 dB above the signal of a mobile unit transmitting from the same location of the control station.

3.6 CONTROL STATIONS (continued)

As with other stationary elements of a system, the location of all control stations shall be given, by street address, latitude and longitude. Ground elevation, antenna height, transmitter power and antenna type and orientation shall be given.

3.7 CONTROL STATIONS USED AS BACKUP SYSTEM

It is understood that some jurisdictions and/or system users will desire some method of system backup that is both effective and inexpensive. Although provisions have not been made for this in either the Federal Communications Commissions Rules and Regulations or in the NPSPAC plan, an attempt shall be made in the provisions of this Regional plan to allow such operation.

The use of a control station as a system backup makes good application and economical sense. Some minor changes may be necessary in some applications to avoid interference with adjacent systems or co-channel systems. These changes are listed below:

- a. The antenna used for control purposes must be of the directional (yagi) design so that received signal strength at the mobile relay is as mentioned above. The antenna used for backup will usually be of the omni-directional type, but may be directional is required, as in the mobile relay, the antenna height above average terrain and the gain of the antenna, coupled with the transmitter power must be given as listed above.
- b. The calculated coverage of the backup station shall be mapped as is the mobile relay. A method to switch between antennas must be used. The method chosen shall be included in the application for license, as well as the written plan for the use of the control/backup station.

4.0 COMMUNICATIONS REQUIREMENTS

4.1 COMMON CHANNEL IMPLEMENTATION

The implementation of the International Common Channels must follow the guidelines as set forth by the Federal Communications Commission by the approval of the National Plan. These five common channels are accessible by all levels of government and shall be used in accordance with the provisions of the National Plan. All mobile and portable equipment must be equipped to operate in the "talkaround mode" when required on the International Channels.

The International calling channel (821/866.0125 MHz) shall be implemented as a full mobile relay. Wide area coverage transmitters will be installed where applicable within a system. Large system users (5 channels or more) of 800 MHz

4.1 COMMON CHANNEL IMPLEMENTATION - continued

shall be required to monitor this channel at all times. The area of coverage for this channel shall be equal to the area covered by the licensed system. This may or may not require the use of satellite receivers within the area to meet this requirement.

The four International Tactical (ITAC) Channels will be assigned State-wide, for use as needed by all eligible licensees. These channels are to be used in accordance with the National Plan and in compliance with the regulations as set forth by the Federal Communications Commission. These channels require no special licensing, only that the users be eligible for licensing on the other Public Safety 800 MHz channels as specified in section 90.616 (a) of the FCC Rules and Regulations.

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4.1.1 AREAS OF OPERATION

The common channels shall be available for use throughout the Region. No specific assignments were deemed necessary within the Region.

4.1.2 OPERATION ON THE COMMON CHANNELS

Normally, the five interoperable channels are to be used only for activities requiring inter-communications between agencies not sharing any other compatible communications system. Interoperable channels are not to be used by any level agency for routine, daily operations. In major emergency situations, one or more ITAC channels may be assigned by the primary Public Safety Agency within that area of operation. The primary Public Safety agency in each county, if not defined elsewhere in the plan, shall be the County Sheriff's Department or Public Safety Department or the lead agency, which may be any agency licensed to operate in this spectrum, or "on-scene" commander. The primary Public Safety

4.1.2 OPERATION ON THE COMMON CHANNELS - continued

agency shall be the city level Public Safety Department in situations which occur within the corporate limits of said city. These primary agencies will assign one or more of the ITAC channels for use according to need during each special situation requiring the use of these channels.

Participants in the interoperable channels include Federal, State, and Local Disaster Management agencies. Police, Fire, and providers of Basic and Advanced Life support services will be the primary using agencies. If radio channels are available, other services provided in the Public Safety Radio Services and the Special Emergency Radio Services may also participate to the extent required to insure the safety of the public. These agencies include the Highway Department, Motor Vehicle Comptroller, Forestry, Wildlife and other special service agencies not normally involved in day-to-day public safety operations.

4.1.3 OPERATION PROCEDURES

On all Common Channels, plain English will be used at all times, and the use of unfamiliar terms, phrases, or codes will not be allowed.

4.1.3(I) INTERNATIONAL CALLING CHANNEL (ICALL):

The ICALL channel shall be used to establish contact with other users in a particular Region that can render assistance at an incident. This channel shall not be utilized as an ongoing working channel. Once contact has been established between agencies, an agreed upon ITAC or mutual aid channel shall be used for continued communications.

4.1.3(II) INTERNATIONAL TACTICAL CHANNELS (ITAC-1 - ITAC-4):

These frequencies are reserved for use by those agencies involved in inter-agency communications. Incidents requiring multi-agency participation will utilize these frequencies as directed by the control agency assuming responsibility for an incident or area of concern. These frequencies may be subdivided according to function in an incident or by geographical location in response to an incident. It is recommended that the following assignments for ITAC-1 through ITAC-4 be used when possible.

4.1.3(II) INTERNATIONAL TACTICAL CHANNELS (ITAC-1 - ITAC-4): (continued)

ITAC-1.....	Law Enforcement
ITAC-2	Fire Services
ITAC-3	Emergency Medical Services
ITAC-4	Command and Control

4.1.4 CODED SQUELCH

All equipment capable of operating on the five (5) common channels shall be equipped with the National Common Tone Squelch of 156.7 Hz. Mobile relays on these channels, if authorized, may use additional tone or digital squelch codes for the purpose of selecting individual mobile relay stations, provided the National Common Tone Squelch Code is used on the output. If such an arrangement is utilized, provision must also be made for certain centralized, high level sites to be activated by the 156.7 tone to ensure emergency access by transient units.

4.2 NETWORK OPERATING METHODS

Communications systems on ITAC-1 through ITAC-4 will be implemented by agencies who volunteer on a distributed coordinated basis. Every primary geographic section of the Region is intended to be covered by at least one of the ITAC channels. In many areas the common channels will be utilized on a mobile to mobile talk-around basis. Mobile relays on ITAC-1 through ITAC-4 will be on a limited coverage design to permit reuse of the channel several times within the Region and in adjacent regions. Since Region 50 will probably not have a large number of stationary ITAC Channel stations, the implementation of mobile relay or repeaters is strongly encouraged. This will fill an "on-scene" requirement for most multi-agency response situations. Adjacent region coordination will be via existing mutual aid coordination procedures with the requesting region establishing the tactical frequency assignment.

4.3 REQUIREMENTS FOR TRUNKING

All systems operating in the Region having five or more channels will be required to be trunked. Those systems having four or less channels may be conventional. It is strongly suggested that any entity licensing three or more repeaters use trunking.

The FCC in its Report and Order states: "Exceptions will be permitted only when a substantial showing is made that alternative technology would be at least as efficient as trunking or that trunking would not meet operational requirements. Exceptions will not be granted routinely. Strong showings as to why trunking is unacceptable must be presented in support of any request for exception."

Systems that do not meet FCC loading standards can be required to share such frequencies on a non-exclusive basis. Those agencies requesting Data channels only can be required to share channels with adjacent agencies wherever feasible or limit coverage to their geographic area. Exceptions will be considered on a case-by-case basis by the Regional Review Committee.

Depending on systems loading and the need for multiple systems within an area, operators of wide area systems (including, but not limited to, designated "Monitoring Agencies") must provide for coordination between area-wide systems and "Monitoring Agencies". Single municipalities or agencies must restrict

4.3 REQUIREMENTS FOR TRUNKING (continued)

design and implementation of their systems(s) to provide only the communications needed within its geopolitical boundaries. The use of trunked systems is encouraged. However, if the total number of radios in service does not reach minimum loading criteria for a trunked system, that user must consider utilizing the next higher system level if 800 MHz trunked radio is available in the area. As systems reach capacity, the smaller system users must consider consolidating their communications systems to formulate one large trunked system.

A requesting applicant for radio communications in the 800 MHz public safety services in the Region will be required to conform to the FCC loading criteria for its proposed system. The provisions of this regional plan must be used as a guide for establishing any new systems. Strict adherence for limiting the area of coverage to the boundaries of the applicant agency's jurisdiction must be observed. Overlap or extended coverage must be minimized, even where systems utilizing 800 MHz trunked radio systems are proposing to intermix systems for cooperative and/or mutual aid purposes.

Antenna heights are to be limited to provide only the necessary coverage for a system. When antenna locations are restricted to only the "high-ground", transmitter outputs and special antenna patterns must be employed to produce only the necessary coverage with the proper amount of ERP. All necessary precautions are to be taken to gain maximum reuse of the limited 800 MHz spectrum.

4.4 CHANNEL LOADING REQUIREMENTS

An agency/jurisdiction requesting a single frequency to replace a frequency currently in use that will be turned back for reassignment will not be required to meet loading requirements in order to obtain the new frequency. However, if the single frequency is not loaded to more than 50 units within three years after the license is granted, the frequency will be available for assignment to other agencies on a shared basis in the event that other frequencies meeting the criteria for assignment are exhausted. Shared use of a frequency is not interference free. Users of single frequency systems may be required to provide the Regional Review Committee "confirmation of loading" for mobiles and portables as a method of validating system loading. This exception shall apply to agencies having only one system and a single frequency. Agencies/jurisdictions requesting multiple frequencies or employing trunking technology shall comply with the loading standards as outlined below or provide a "Traffic Loading Study" that meets the criteria as outlined below.

4.4.1 LOADING TABLES

<u>EMERGENCY</u>		<u>NON-EMERGENCY</u>	
CHANNELS	UNITS/CHANNEL	CHANNELS	UNITS/CHANNEL
1 - 5	70	1 - 5	80
6 - 10	75	6 - 10	90
11 - 15	80	11 - 15	105
16 - 20	85	16 - 20	120

Agencies requesting additional frequencies must show loading of 100 percent or greater on their existing system. Should a demand for frequencies exist after assignable frequencies become exhausted, any system having frequencies assigned under this plan four or more years previously and not loaded to at least 70 percent will lose operating authority on a sufficient number of frequencies to bring the system into compliance with the 70 percent loading standard. Frequencies lost in this manner will be reallocated to other agencies to help satisfy the demand for additional frequencies.

4.4.2 TRAFFIC LOADING STUDY

Justification for adding frequencies, or retaining existing frequencies, can be provided by a traffic loading study in lieu of loading by number of transmitters per channel. It will be the responsibility of the requesting agency to provide a verifiable study showing sufficient airtime usage to merit additional frequencies. A showing of airtime usage, excluding telephone interconnect air time, during the peak busy hour greater than 70 percent per channel on three consecutive days will be required to satisfy loading criteria.

4.4.3 SLOW GROWTH

All systems in the 821-824/866-869 MHz bands under this will be slow growth in accordance with Section 90.629 of the Commission's rules.

4.5 USE OF LONG RANGE COMMUNICATIONS

During incidents of major proportions, where Public Safety requirements might include the need for long-range communications in and out of a disaster area, alternate radio communications plans are to be addressed by Primary Public Safety agencies within this sub-region. These agencies should integrate the appropriate interface to the long distance communications providers. Such long distance radio communications might be amateur radio operations, satellite communications and/or long range emergency preparedness communications systems, any of or all of which should be incorporated as part of the communications plans of those lead agencies. They then could provide the means to communicate outside the area for themselves and the smaller agencies who might need assistance. Instances as addressed in the National Public Safety Planning Advisory Committee's Plan, such as earthquakes, hurricanes, floods, widespread forest

4.5 USE OF LONG RANGE COMMUNICATIONS - continued

fires, or nuclear reactor problems could be a cause for such long-range communications needs.

4.6 EXPANSION OF EXISTING SYSTEMS

Existing systems that are to be expanded to include the frequency bands of 821-824/866-869 MHz will have the mobile radios "grandfathered", provided that they are modified in conformance with the Memorandum Opinion and Order, FCC Docket 87-112. Primarily this involves reducing the modulation to +/- 4 MHz. Existing base stations in the frequency bands 806-821/851-866 MHz may not be used in the frequency bands 821-824/866-869 MHz.

4.7 AIRCRAFT OPERATION

Radio equipment installed in aircraft that operates on channels in the 821-824/866-869 MHz spectrum shall be limited to a maximum ERP of ONE watt. Individual cases of routine harmful interference at this power level may require reduced ERP at the discretion of the Regional Review Committee.

4.8 USE OF AUTOMATIC TELEPHONE INTERCONNECT

The use of a car radio telephone via automatic interconnect through an 800 MHz trucked radio system or other type two-way radio communications radio system will normally require a significant amount of air time. Therefore, the use of automatic interconnect for radiotelephone is not recommended for individuals or agencies which have a vast need for interconnect, in favor of cellular service, where available.

5.0 IMPLEMENTATION AND PROCEDURES

5.1 NOTIFICATION

Several methods of notification were used to invite interested parties to participate in the development of this plan. A request was made to the Permian Basin Regional Planning Commission, to place a public notice in the newspapers with regional distribution on behalf of the Region 50 Planning Committee. A bulletin announcing the first organizational meeting was transmitted, on several different occasions, over the TLETS (Texas Law Enforcement Telecommunications System) network, to the affected agencies of Region 50, by the Convener. Personal contact was made by the Convener with representatives of several Public Safety/Public Service agencies.

Contact was made with the State Frequency Coordinator for the State of Texas, who is acting on behalf of all State Agencies with reference to the

5.1 NOTIFICATION - continued

National Plan. The State Frequency coordinator was appointed as a resource member of the Regional Planning Committee.

Contact was made with the Regions contiguous to Region 50, including the State of New Mexico, and were appointed as resource members of the Regional Planning Committee.

The first meeting was held at the Permian Basin Regional Planning Commission Building, a public facility, at Midland International Airport. The chairman was elected at the first organizational meeting. During this initial meeting, it was decided that the Region 50 Plan would use the Region 40 Plan, where applicable, as a guideline. Not only would this avoid a duplication of effort, but also attempt to add a degree of conformity to other Texas plans. Ultimately, however, it was decided that the APCO "Generic" plan be used, for these same purposes.

During the initial meeting, names, addresses and telephone numbers of those individuals present who wished to either participate in the planning process, or who wanted to be kept informed on the progress of the planning effort were taken. These individuals or agencies were sent all announcements for meetings and bulletins of progress.

When the work on the plan was completed, a final planning committee meeting was called. This meeting was held at the Concho Valley Council of Governments, Southland Plaza, 5014 Knickerbocker Road, San Angelo, Texas on March 17, 1992, at 9:00 AM CST. Each member of the planning committee was presented with a draft copy of the plan for study. A copy of the final draft was mailed to each member of the committee not present at the meeting. Each plan contained a ballot for voting on the acceptance of the plan.

As with the formation of the committee, a public notice was placed in the Midland Reporter Telegram Newspaper (see APPENDIX B) announcing the completion of the plan and the intention to file with the Federal Communications Commission. This same announcement was also run over the Texas Law Enforcement Telecommunications Network (TLETS).

5.2 FREQUENCY ALLOCATION PROCESS

The method used for "packing" Region 50 was the APCO/CET computerized method. The approximate geographical location for the center of each county, in latitude and longitude, were provided along with the environmental type of the county and the approximate radius to cover the county lines. Along with this information, a list of frequencies to block along the adjacent region's border was included. The number of frequencies allocated to each county has been correlated to population with a minimum of two frequencies per county, and an additional frequency for each 25,000 population above 50,000. The State of Texas has reserved twenty (20) channels statewide. This leaves a reserve pool of channels for future assignment.